

MHD numerical simulations of wind-wind collisions in massive binary systems

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In the past years, several massive binary systems have been studied in details on both radio and X-rays wavelengths, revealing a whole new physics present in such systems. Large emission intensities in X-rays showed us that most of the radiation in these wavelengths originates at the wind-wind collision region. OB and WR stars present supersonic and massive winds that, when under collision, emits largely on X-rays due to the free-free radiation. Similarly, radio observations revealed these systems as a major source of non-thermal radiation at radio wavelengths. However, in this case, magnetic fields play an important role on the emission distribution. In this work we provide a number of the first MHD numerical simulations of wind-wind collision in massive binary systems ever. We study the emission of X-rays due to free-free emission, characterizing its dependence on the stellar and orbital parameters. We also study the evolution of the magnetic field at the shock interfaces, obtaining also the synchrotron energy distribution integrated along different lines of sight.